Automation in the garden: Part 4—alternating trains

East Broad Top N°s 1 and 3 meet momentarily in front of Blacklog Station before N° 3 heads out over the line. Having multiple trains running around the railroad adds visual interest, as you're not always seeing the same train running through the garden. A passing siding in front of a station is a natural place to stop two trains, though such sidings can also be hidden from view to keep the viewer guessing where the train went.

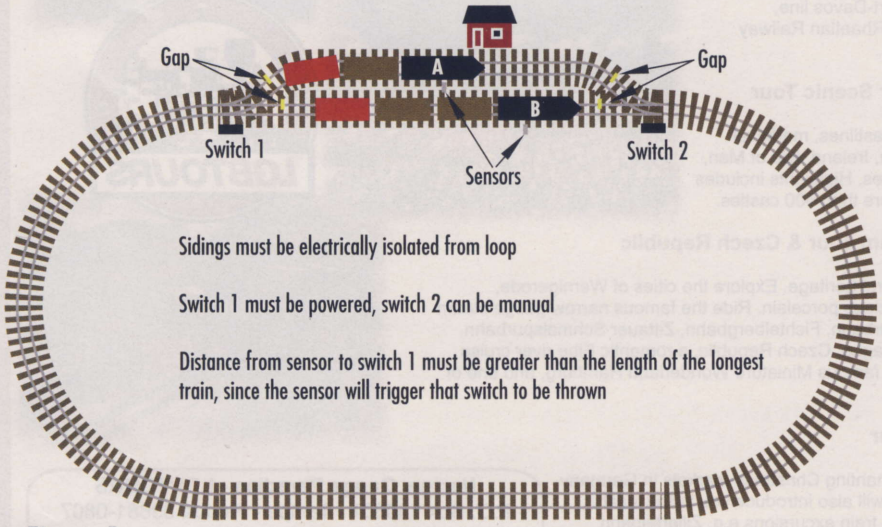


Figure 1
Alternate running of two trains on a single loop with passing siding

When I was a kid, I saw a railroad on which I was able to follow the train all the way around the track. When the train went into a tunnel, I fully expected to see it emerge from the other side. Imagine my surprise when a different train came out. The railroad was built with a hidden loop and storage siding inside the mountain. When one train entered, it triggered the second train to exit.

Such magic is often the foundation of the various automation projects we build into our railroads. Multiple trains add visual interest and keep our eyes from becoming bored seeing the same train all the time. In this installment, I'll talk about the simplest means of automatic, alternating-train operation around a railroad. This involves a passing siding on a loop that will allow two trains to take turns each time around the loop. This passing siding would commonly be located in front of a depot or other focal point where you might expect to see multiple trains

LGB's EPL components: (right to left) the switch machine, DPDT accessory switch (detached for illustration), and magnetic track sensor (with cover removed)

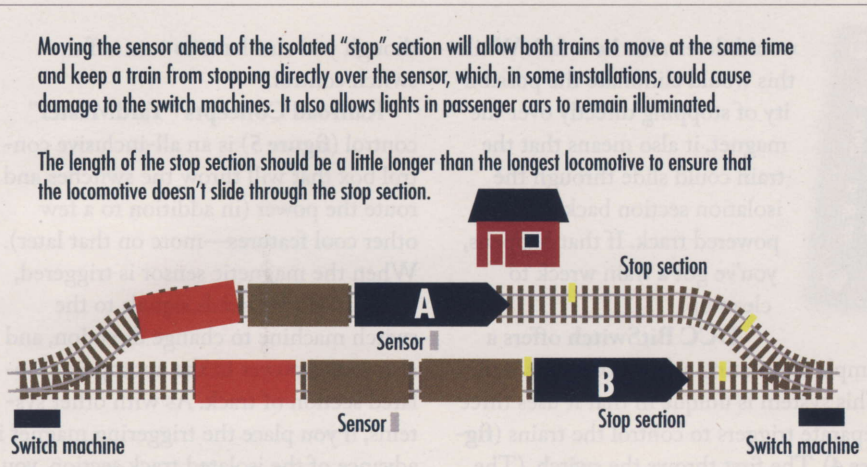


Figure 2 - sensor placement

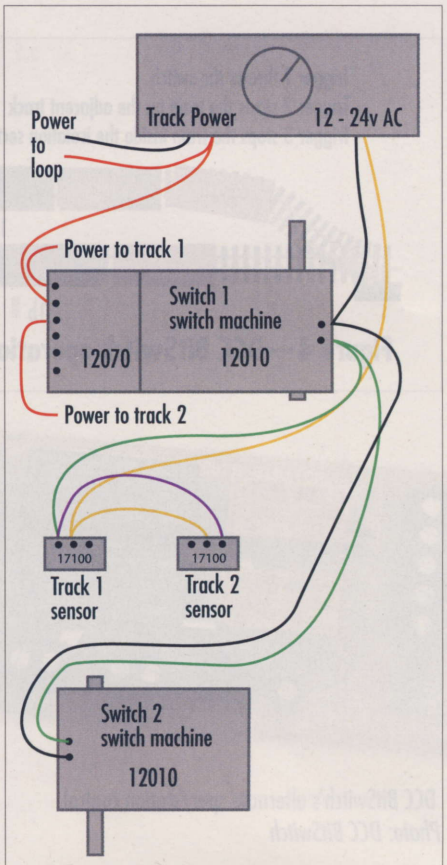


Figure 3 - LGB component wiring

stopped. But, as in the case of the railroad I described, the sidings could be hidden from view, adding a sense of mystery to the action.

How it works

Three things need to happen for this level of automation to work properly. First, you need to be able to determine when a train enters the passing siding. Second, you need to shut the power off to that train and route it to the other, in order to send that one on its way. Third, you need to be able to control the switches to the passing siding so the trains don't hit each other (**figure 1**).

The first component—determining the location of the train—is the key part of the process. As we've seen in the previous parts of this series, most systems rely on magnets to trigger various automatic events. Others rely on sensing current. Routing power to either the mainline or the passing siding can be done either mechanically (via a toggle switch) or electronically. You'll also need switch machines to throw the switches.

You must first isolate one rail in each of the two tracks. This should be the same rail on both, though which rail isn't important. Power from the throttle will be wired to the rails on the main loop, then the control electronics will route the power from the loop to whichever track is to be powered at a given time.

What happens with these controls is this: Train A runs around the loop and enters the passing siding. Once it is far enough into the siding for the last car to clear the switch, the train passes over a trigger that throws the switches on the passing siding to the other route so that Train B, on the adjacent track, can leave. The trigger also transfers power from Train A's track to Train B's. Train B takes off around the loop and Train A stops.

You needn't isolate the entire passing siding, just a section long enough to cut power to the locomotive (**figure 2**). This does two things; it allows Train B to leave and also allows Train A to continue running beside it until it gets to the intended stopping point. Also, if you have lighted passenger cars or a caboose, it allows the cars to remain lit, with only the locomotive sitting without power. (For this to work, there cannot be any connection between the locomotive and the lit passenger cars.) So, let's take a look at some of the commercial systems that facilitate this operation.

Available products

I'll start with **LGB's EPL** system, since it's probably the most simple in terms of operation (**figure 3**). It uses a DPDT accessory switch attached to the electronic switch machine to route power. Essentially, it turns the passing siding into a power-routing device, where the position of the points dictates which isolated section of track gets the electricity. Magnets in each of the passing sidings control the position of the switch.

There are a few things to consider with

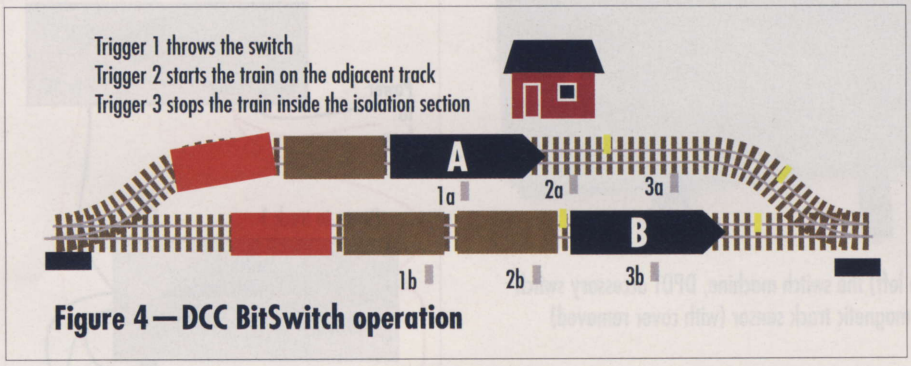
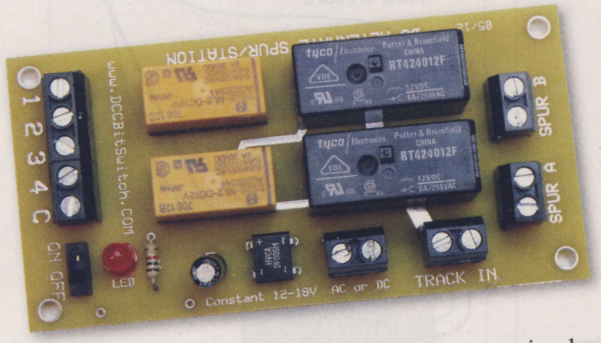


Figure 4—DCC BitSwitch operation

About this series

August 2012: Auto-reverse systems
October 2012: The station stop
December 2012: Reverse loops
April 2013: Multiple trains on one loop at one time
June 2013: Combining features and advanced concepts in automation



DCC BitSwitch's alternate spur/station control. *Photo: DCC BitSwitch*

this system. First, the trigger magnet should be placed ahead of the isolation section so, when the switch is thrown, the power is not immediately cut. Otherwise, you risk stopping the locomotive with its magnet sitting over the reed switch, which would keep power flowing to the switch motor and could possibly damage it. The isolation section must be long enough to contain your longest locomotive, with a little extra pad. If the train is going fast enough when the locomotive enters the isolation section, it's going to slide a bit as it comes to a stop (speed and weight would determine how far). While this would eliminate the possibility of stopping directly over the magnet, it also means that the train could slide through the isolation section back onto the powered track. If that happens, you've got a train wreck to clean up.

DCC BitSwitch offers a simple alternating siding control as well. This system is unique in that it uses three separate triggers to control the trains (**figure 4**). The first throws the switch. (The control for throwing the switch is not included on the siding control board; the company sells reed switches that will control an LGB switch machine or you can use the EPL reed switches.) The second trigger starts the train on the adjacent track moving, while the third stops the first train. (The operation of the second and third triggers is similar to other installations, where a magnetic sensor is placed in advance of the isolated section.) The DCC BitSwitch control has an "off" switch that will bypass the automation, allowing a train to run continuously, though you also have to turn off the switch control.

Railroad Concepts' "YardMaster" control (**figure 5**) is an all-inclusive control box that will throw the switches and route the power (in addition to a few other cool features—more on that later). When the magnetic sensor is triggered, the YardMaster sends signals to the switch machine to change direction, and also routes power to the appropriate isolated section of track. As with other systems, if you place the triggering magnet in advance of the isolated track section, you can start the second train before the first one stops.

The YardMaster controller also allows you to "count" laps around the loop. This enables you to run a train around the loop multiple times before it stops in the siding again and sends the next train out. The controller also has outputs that can be used to control signals, so the lights could change from red to green in accordance with which track was powered.

The YardMaster, like the two previous systems discussed, stops the train instantly when it reaches the isolation section.

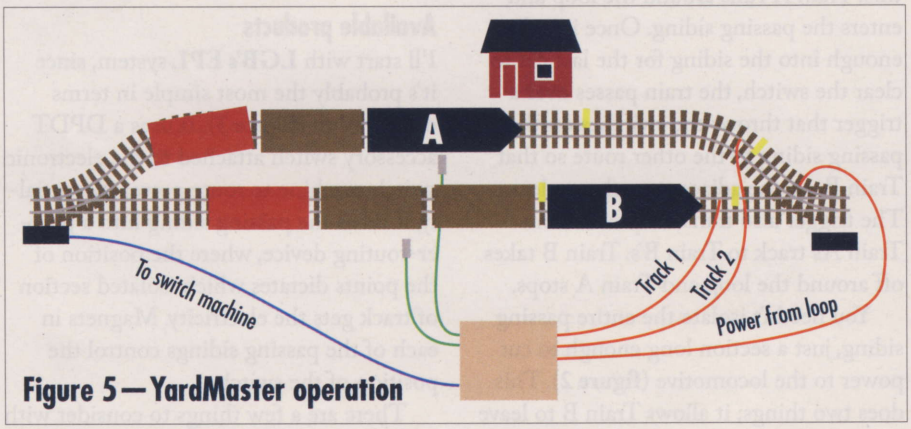
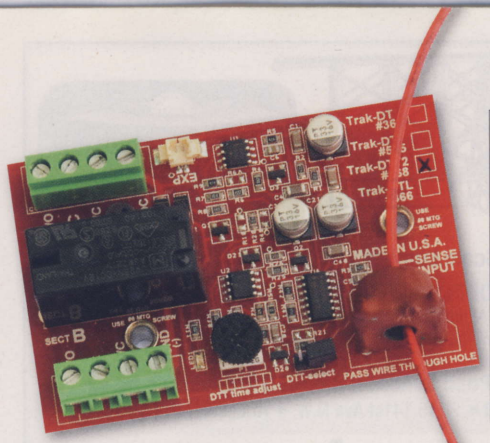


Figure 5—YardMaster operation

RR Concepts' YardMaster control



Dallee's Trak-DTT sensor, the heart of the alternate-siding control. The component with the wire running through it is the current sensor, which triggers the necessary events.

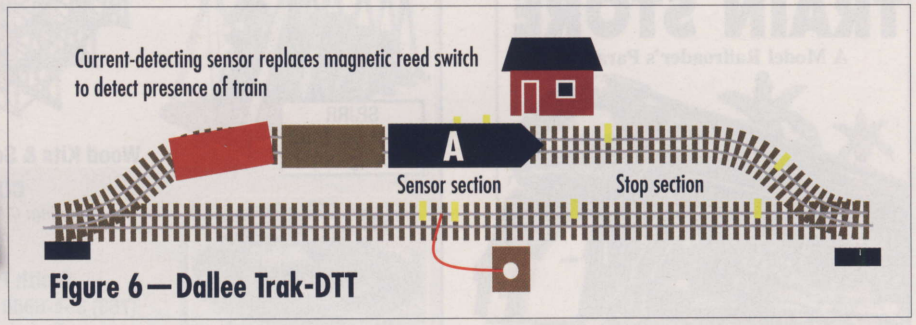


Figure 6—Dallee Trak-DTT

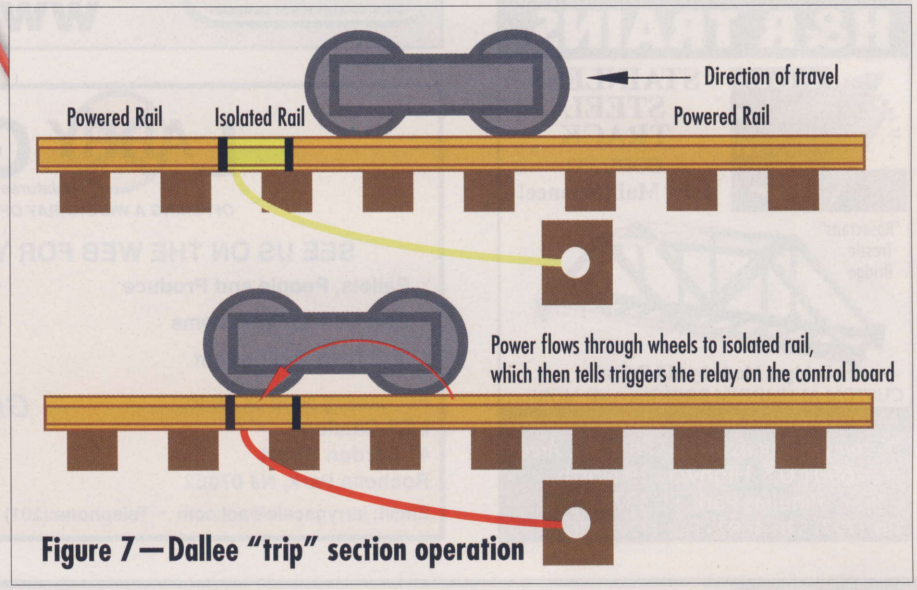


Figure 7—Dallee "trip" section operation

With the addition of **Railroad Concepts' "StationMaster"** controller, you can set the trains to decelerate and accelerate slowly into and out of the sidings.

Dallee offers a system that does not use magnets to trigger the events. Instead, it senses the current being drawn by the train. This is good for railroads on which it may not be practical to equip every locomotive with a magnet to trigger the sensors, such as club displays.

Dallee's system uses three of their Trak-DTT sensors hooked together to control the position of the switch and power to each siding (**figure 6**). The track on the siding would be laid out identically to the others discussed above, with an isolated "stop" section located where you want the locomotive to stop. However, instead of putting a magnetic reed switch under the track, you cut the rail in two places to leave a short "trigger" section of track that gets wired to the control boards. As the locomotive crosses one of these isolated sections, current flows from the powered section of track into the isolated section. A wire runs from this isolated section to a sensor on the board. When it detects current, it triggers the appropriate changes (**figure 7**).

When wired as per the example in Dallee's wiring guide, this set-up is like the others—instantly on and off. Dallee's momentum control can be added for slow starts and stops but the wiring becomes more complex.

These systems are great for running two trains on a loop, one at a time. Next time I'll look at how to run multiple trains on the same loop at the same time, without worrying about them colliding with each other.

Sources and parts list

Manufacturer	Product(s) used	Price
RR Concepts	YardMaster	$55.00
	StationMaster *Optional—needed for slow start/stop only*	$89.00
LGB	#12010 Switch Machine *One needed, second one optional*	$39.98
	#12070 EPL Turnout/Signal controller	$39.98
	#10260 Insulated rail joiners (4/pk)	$9.98
	#17100 Track contact *Two needed, one per track*	$20.98
Dallee Electronics	#369 12V regulated power supply	$19.95
	#565 Trak-DTT *Three needed*	$34.95
	#MO-1 Momentum control *Optional—needed for slow start/stop only*	$49.95
DCC BitSwitch	DC Alternate spur/station control	$69.95

Contact information for product sources:

RR Concepts
1357 Hodges Rd.
Oceanside CA
92056
www.rr-concepts.com

LGB (Wm. K. Walthers Inc., distributor)
5601 W. Florist Ave.
Milwaukee WI 53218
www.walthers.com

Dallee Electronics
246 W. Main St.
Leola PA 17549
717-661-7041
www.dallee.com

DCC BitSwitch
31190 Eagle Crest Ln.
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303-674-3114
www.dccbitswitch.com